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RESULTS

The diagram illustrates the following causal relationships and feedback loops:

- Infected Deaths** (blue box) has a positive effect (+) on **People Gaining Knowledge of Resistant Strain**.
- Word of Mouth From Resistant Strain** has a positive effect (+) on **People Gaining Knowledge of Resistant Strain**.
- People Gaining Knowledge of Resistant Strain** has a positive effect (+) on **People Aware of the Resistant Strain** (blue box).
- People Aware of the Resistant Strain** has a positive effect (+) on **People Gaining Knowledge of Resistant Strain** (reinforcing loop).
- People Aware of the Resistant Strain** has a negative effect (-) on **Infected Deaths** (balancing loop).
- People Aware of the Resistant Strain** has a positive effect (+) on **Current Fraction Taking Correct Dosage**.
- People Aware of the Resistant Strain** has a positive effect (+) on **Current Fraction Finishing Entire Course**.
- Ratio of People Aware to Minimum Number** has a positive effect (+) on **People Aware of the Resistant Strain** (reinforcing loop).
- Minimum Number To Change Behavior** (blue box) has a positive effect (+) on **Ratio of People Aware to Minimum Number**.
- Ratio of People Aware to Minimum Number** has a positive effect (+) on **People Aware of the Resistant Strain** (reinforcing loop).
- Effect of People Aware of Resistant Strain on Fraction Taking Correct Dosage** has a positive effect (+) on **Current Fraction Taking Correct Dosage**.
- Effect of People Aware of Resistant Strain on Fraction Finishing Course** has a positive effect (+) on **Current Fraction Finishing Entire Course**.
- Fraction That Take Correct Dosage** (orange box) has a positive effect (+) on **Current Fraction Taking Correct Dosage**.
- Fraction That Finish Entire Course** (orange box) has a positive effect (+) on **Current Fraction Finishing Entire Course**.
- Current Fraction Taking Correct Dosage** has a positive effect (+) on **Overall Compliance**.
- Current Fraction Finishing Entire Course** has a positive effect (+) on **Overall Compliance**.
- Overall Compliance** has a positive effect (+) on **Infected Deaths** (reinforcing loop).
- Adjustment time for net change in people aware of resistant strain** (blue box) has a negative effect (-) on the flow from **People Gaining Knowledge of Resistant Strain** to **People Aware of the Resistant Strain** (delayed negative feedback loop).
- Net Change in People Aware of Resistant Strain** (stock) is the difference between the inflow from **People Gaining Knowledge of Resistant Strain** and the outflow to **People Aware of the Resistant Strain**.

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graph TD
    A[Total Pathogens Transmitted] -- "+" --> B[Antibiotic Resistant Organism]
    B -- "+" --> C[Probability of Acquiring Resistant Strain]
    C -- "+" --> D[Number Sick Per Year With Resistant Strain]
    D -- "+" --> E[Generated Resistant Pathogens]
    E -- "+" --> A
    R((R))
  
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The diagram illustrates the following causal relationships:

- Average Number Sick Per Year With Resistant Strain** (dashed box) has a positive effect (+) on **Medical Community Gaining Knowledge of Resistant Strain**.
- Gaining Knowledge and Data About Failing Treatment** has a positive effect (+) on **Medical Community Gaining Knowledge of Resistant Strain**.
- Medical Community Gaining Knowledge of Resistant Strain** has a positive effect (+) on **Current Medical Community Knowledge of Resistant Strain**.
- Knowledge from Previous Cases** has a positive effect (+) on **Current Medical Community Knowledge of Resistant Strain**.
- Net change in Average Number of Sick with Resistant Strain** has a positive effect (+) on **Current Medical Community Knowledge of Resistant Strain**.
- Adjustment Time To Interpret New Knowledge** has a negative effect (-) on **Current Medical Community Knowledge of Resistant Strain**.
- Current Change in Medical Knowledge of Resistant Strain** (stock) is the result of the net change in knowledge, leading to **Current Medical Community Knowledge of Resistant Strain**.
- Current Medical Community Knowledge of Resistant Strain** has a positive effect (+) on **Ratio of Current Knowledge to Knowledge for Action**.
- Knowledge for Action** has a positive effect (+) on **Ratio of Current Knowledge to Knowledge for Action**.
- Ratio of Current Knowledge to Knowledge for Action** has a positive effect (+) on **Effect of Resistance Knowledge on Clinical Practices**.
- Effect of Resistance Knowledge on Clinical Practices** has a negative effect (-) on **Clinical Diagnostic Error Remaining**.
- Clinical Diagnostic Error Remaining** has a positive effect (+) on **Prescribing Intensity Ratio**.
- Prescribing Intensity Ratio** has a positive effect (+) on **Current Fraction Overprescribed**.

Together, these learning feedbacks slow the progression of AR but cannot prevent its early reinforcing growth, since both responses depend on resistance becoming established before meaningful behavior change occurs.

Resistance growth is inherently reinforcing and begins early, while learning-driven improvements in healthcare practices occur only after resistance has emerged. This delay limits the effectiveness of reactive interventions, highlighting the importance of early, proactive behavioral changes to extend the useful lifespan of existing antibiotics.